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# DrägerService Mode

## 1 General notes

The DrägerService Mode has four menu levels.

The first menu level contains the following items:

- Information
- Calibrations
- Logs
- Diagnosis
- Back

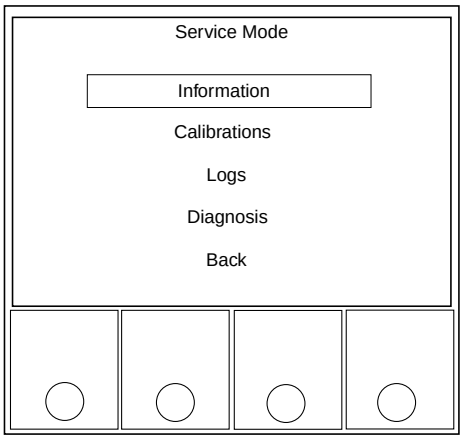



**Fig. 1:** Start page of DrägerService Mode

Each menu level has submenus.

DrägerService Mode can be used to read out device data and activate/deactivate optional features.

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## 1.1 Overview of possible tests

| | |
|---|---|
| **Information** | |
| $O_2$ sensor | O2 sensor |
| Software/operating hours | Software/operating hours |
| Options | Options |
| Service intervals | Service interval |
| **Calibrations** | |
| $O_2$ sensor | O2 sensor |
| Scales | Scales |
| Height adjustment (optional) | Height adjustment (optional) |
| Tilt adjustment | Tilt adjustment |
| **Logs** | |
| Error log | Error log |
| Error history | Error history |
| Operation history | Operation history |
| **Diagnosis** | |
| Operating voltages | Operating voltages |
| Keypad | Keypad |
| Sensor PCB | Sensor PCB |
| WT2 Actuator PCB | Actuator PCB |
| Output signals | Output signals |
| Digital feedback signals | Digital signals |
| Interfaces<br><br>Nurse call<br>Medibus<br>Modem | <br><br>Nurse call<br>Medibus<br>Modem |
| | |

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## 1.2 Accessing the DrägerService Mode

- Plug the power plug of the Caleo into the mains socket.
- Switch on the Caleo at the power switch.

The Caleo runs through its self-test.

- Press the "menu" and "silence" keys (a) simultaneously for 4 seconds.

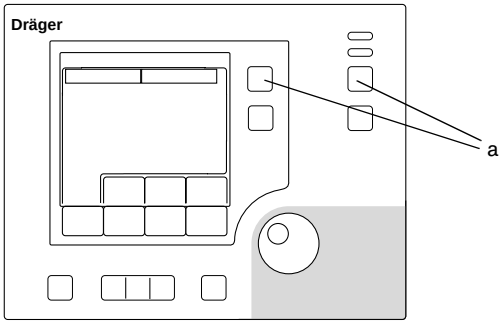



**Fig. 2:** Front view of the display housing

The following menu appears on the EL display:

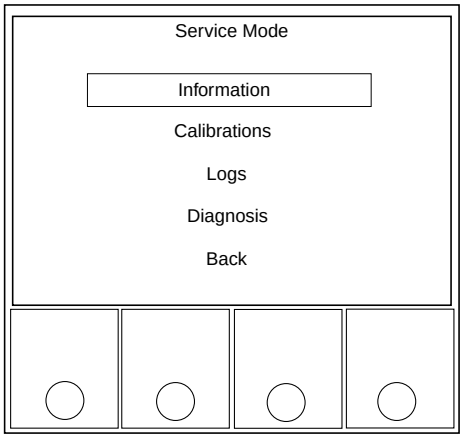



**Fig. 3:** Menu page of DrägerService Mode

- Use the control knob to select the desired menu.
- Press the control knob to activate the desired menu.

The EL display shows the respective submenu.

- Use the control knob to select the desired submenu.
- Press the control knob to activate the desired submenu.

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If the control knob has additional functions, the required command will be shown directly on the EL display.

If additional functions can be selected using the EL display key, it will be shown on the EL display.




## 1.3 Exiting the DrägerService Mode

- Exit the DrägerService Mode as follows: Switch off the Caleo or select the „Back“ functions in the respective EL display pages until Caleo is in the operating mode.

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## 2 DrägerService Mode "Information"

DrägerService Mode "Information" has the following submenus:

- $O_2$ sensor
- Software/operating hours
- Options
- Service interval
- Back

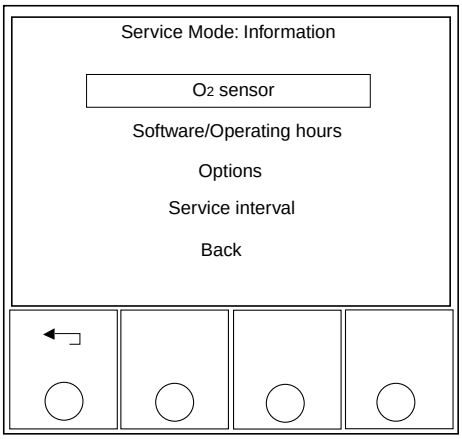



**Fig. 4:** DrägerService Mode "Information"

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## 2.1 O2 sensor

DrägerService Mode "$O_2$ sensor" shows the following $O_2$ measurement data on the EL display:

- Serial number of the $O_2$ Module PCB
- Serial version of the $O_2$ Module PCB
- Serial numbers of the $O_2$ sensors: sensor 1 and sensor 2
- Date of manufacture of the $O_2$ sensors
- Last calibration date
- Next calibration

### 2.1.1 Reading out the O2 sensor data

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Information".
- Press the control knob.

The EL display shows the "Information" menu.

- Use the control knob to select the menu item "$O_2$ Sensor".
- Press the control knob.

The EL display shows the serial numbers, the date of manufacture, and the calibration date.

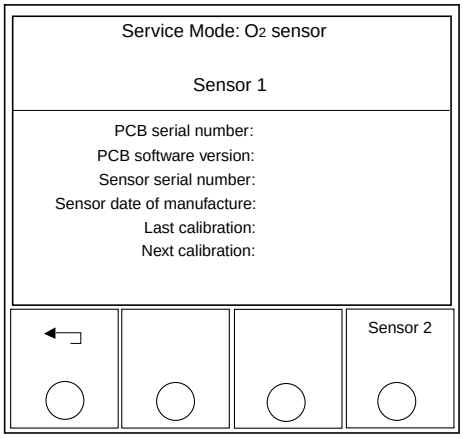
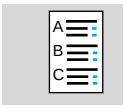



**Fig. 5:** DrägerService Mode, $O_2$ sensor 1

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- If a second $O_2$ sensor is fitted, press the right-hand display key (sensor 2) in order to switch over to the data of the second $O_2$ sensor.



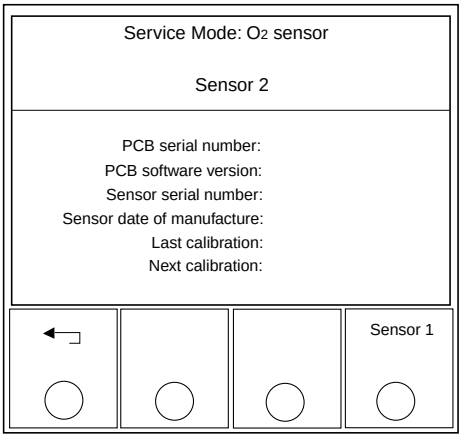




**Fig. 6:** DrägerService Mode, $O_2$ sensor 2

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 2.2 Software/operating hours

DrägerService Mode "Software/operating hours" shows the software version and the operating hours on the EL display. The operating hours can be adjusted.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Information".
- Press the control knob.

The EL display shows the "Information" menu.

- Use the control knob to select the menu item "Software/operating hours".
- Press the control knob.

The EL display shows the software version and number of operating hours.

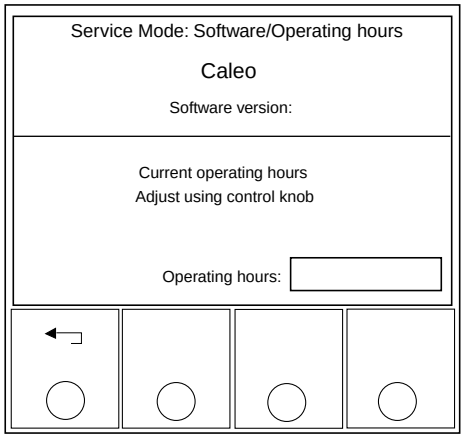


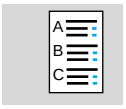

**Fig. 7:** DrägerService Mode, software version/operating hours

- Press the control knob to activate the operating hours.
- Use the control knob to adjust the desired operating hours.
- Press the control knob to store the desired operating hours (Note: The operating hours should be adjusted within max. 2 minutes. Otherwise the Caleo will return to its normal operating mode.).
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 2.3 Options

DrägerService Mode "Options" shows the following options on the EL display:




- O2 module
- Humidity module
- Mattress module
- Scales module
- Interface board

Each module can be addressed individually: The individual modules have different control functions which can be selected using the control knob. Activated device options will be tested during the self-test. Device options that are not available/not installed are marked as "not installed" in the status field of the EL display.

| Module | Function |
|---|---|
| O2 module | not installed<br>Monitoring<br>Closed-loop control |
| Humidity module | not installed<br>Closed-loop control<br>Control |
| Mattress module | not installed<br>installed |
| Scales module | not installed<br>installed |
| Interface board | not installed<br>installed |

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Information".
- Press the control knob.

The EL display shows the "Information" menu.

- Use the control knob to select the menu item "Options".

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- Press the control knob.

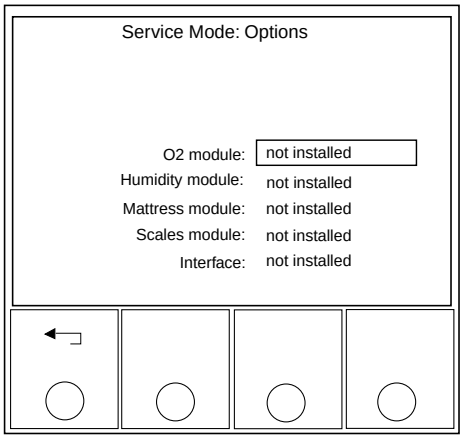



**Fig. 8:** DrägerService Mode, options

- Use the control knob to select the respective menu item.
- Press the control knob to activate the menu item.
- Use the control knob to select the desired function.
- If necessary, switch the Caleo off and on again in order to enable the desired function.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 2.4 Service interval

DrägerService Mode "Service interval" shows the service interval data on the EL display: A message is displayed when 80% of the set service interval time has elapsed. The values in the right-hand column show the remaining time until the next service interval.

- Inspection data
- Operating hours
- MTK (metrological check of skin-temperature measurement)

Deactivated messages are indicated by three double dashes. Switch on the Caleo at the power switch.

- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Information".
- Press the control knob.

The EL display shows the "Information" menu.

- Use the control knob to select the menu item "Service interval".
- Press the control knob.

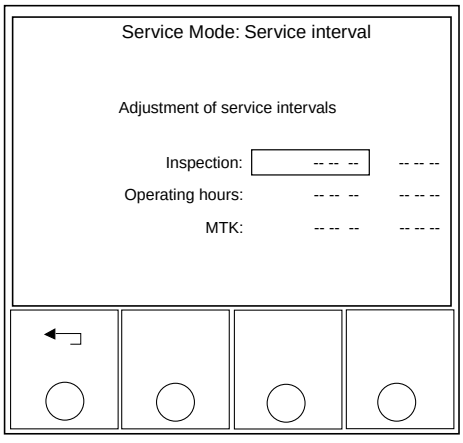



**Fig. 9:** EL display, service intervals

- Use the control knob to select the desired menu item "Inspection".
- Press the control knob to activate the desired menu item.
- If applicable, enter the inspection time using the control knob.
- Press the control knob to store the inspection time.

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- If applicable, enter the operating hours using the control knob.
- Press the control knob to activate the menu item.
- If applicable, enter the operating hours using the control knob.
- Press the control knob to store the operating hours.




- Use the control knob to select "MTK".
- Press the control knob to activate the menu item.
- If applicable, use the control knob to enter the time for the metrological check.
- Press the control knob to store the time for the metrological check.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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# 3 Calibrations

DrägerService Mode "Calibrations" can be used to calibrate the $O_2$ sensor, the scales, the height adjustment, and the tilt adjustment.

DrägerService Mode "Calibrations" has the following submenus:

- $O_2$ sensor
- Scales
- Height adjustment
- Tilt adjustment
- Back

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Calibrations".
- Press the control knob.

The EL display shows the possible calibrations.

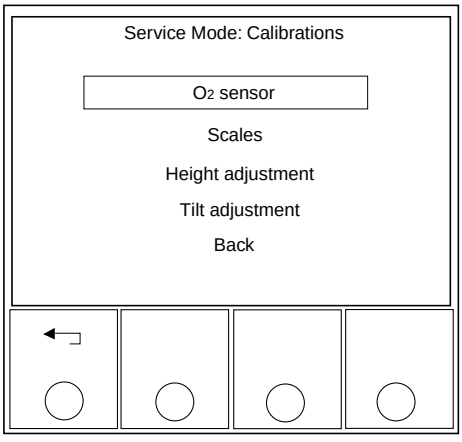



**Fig. 10:** DrägerService Mode, calibrations

- Press the return key to jump to the next higher menu level, or
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 3.1 O2 sensor

DrägerService Mode "O2 sensor" can be used to calibrate $O_2$ sensors to 21 vol.% O2.

- Make sure 21% O2 is available.
- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Calibrations".
- Press the control knob.
- Use the control knob to select the menu item "$O_2$ sensor".
- Press the control knob.

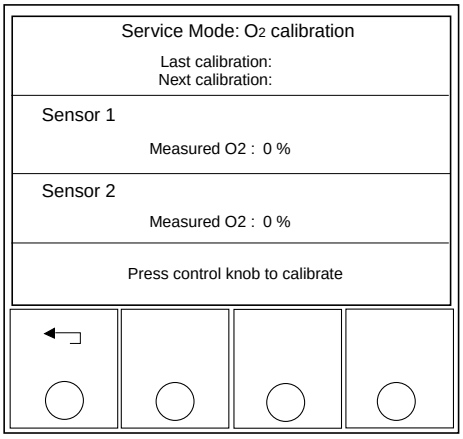



**Fig. 11:** DrägerService Mode, $O_2$ calibration 1

- Press the control knob to start calibration of the $O_2$ sensors. (Note: If the $O_2$ sensors are not sufficiently warm it is not possible to carry out a calibration. The EL display shows the remaining time until the $O_2$ sensors can be calibrated.)

The $O_2$ sensors are calibrated.

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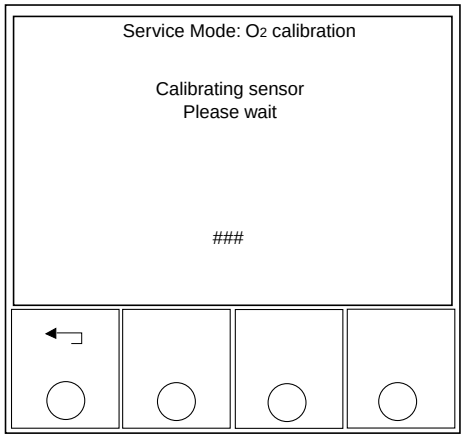



**Fig. 12:** DrägerService Mode, $O_2$ calibration 2

The message "calibration successful" or "not calibrated" appears on the EL display as soon as the $O_2$ sensor calibration is finished.

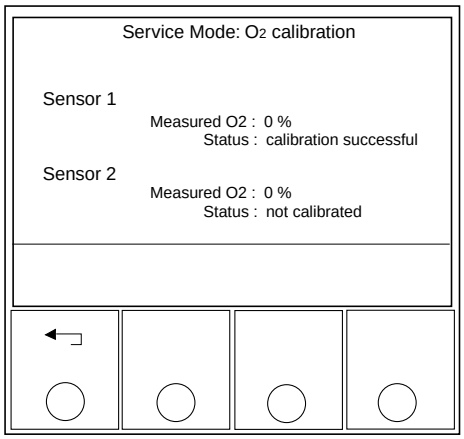



**Fig. 13:** DrägerService Mode, $O_2$ calibration 3

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 3.2 Scales

DrägerService Mode "Scales" is used to calibrate the scales to a specific reference value. The EL display shows the following information:

- Number of previous calibrations
- Current weight
- Adjusting the scales

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Calibrations".
- Press the control knob.
- Use the control knob to select the menu item "Scales".
- Press the control knob.

The EL display shows the following data:

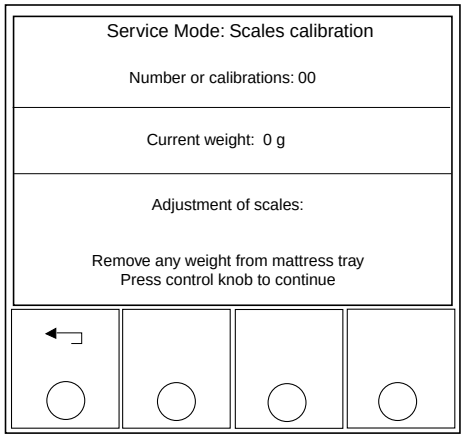



**Fig. 14:** DrägerService Mode, calibrating the scales 1

Calibration is done in several steps:

- Remove any weight from the mattress tray before adjusting.
- Press the control knob.

The scales are adjusted.

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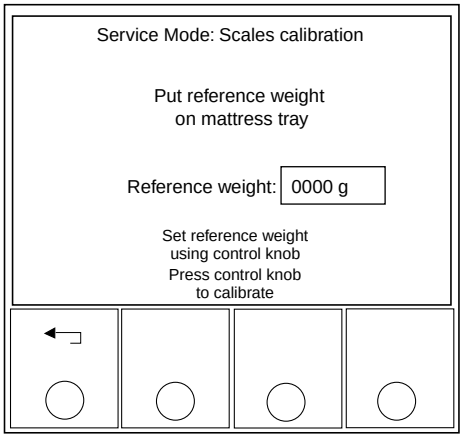



**Fig. 15:** DrägerService Mode, calibrating the scales 2

- Put a reference weight on the scales.

Use the control knob to enter the reference weight.

- Confirm weight.

The scales are calibrated. The EL display shows the reference weight in grams.

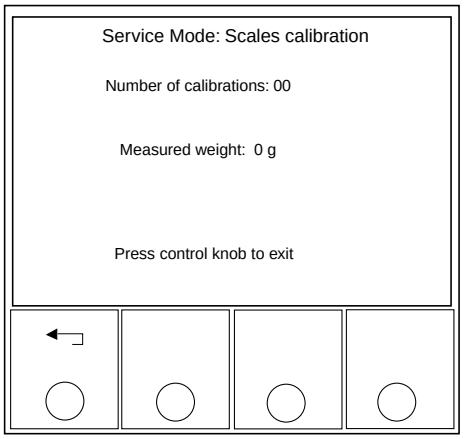



**Fig. 16:** DrägerService Mode, calibrating the scales 3

- Press the control knob to exit the menu.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 3.3 Height adjustment

DrägerService Mode "Height adjustment calibration" is used to calibrate the height adjustment motor. The EL displays shows the previous height adjustment value, the new height adjustment value, and the automatic calibration.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Calibrations".
- Press the control knob.
- Use the control knob to select the menu item "Height adjustment".
- Press the control knob.

The EL display shows the following information:

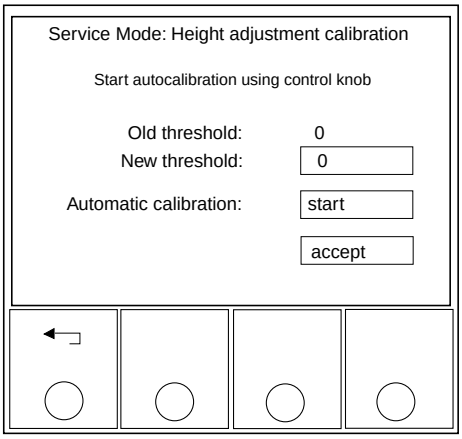



**Fig. 17:** DrägerService Mode, height adjustment

### 3.3.1 Adjusting the manual threshold

- Turn the control knob to place the cursor on the "new threshold" field and then press the control knob.
- Use the control knob to adjust the new threshold and then press the control knob.
- Use the control knob to select the "Accept" field.
- Press the control knob to confirm.

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### 3.3.2 Adjusting the automatic threshold

- Turn the control knob to place the cursor on the "start" field.
- Press the control knob.

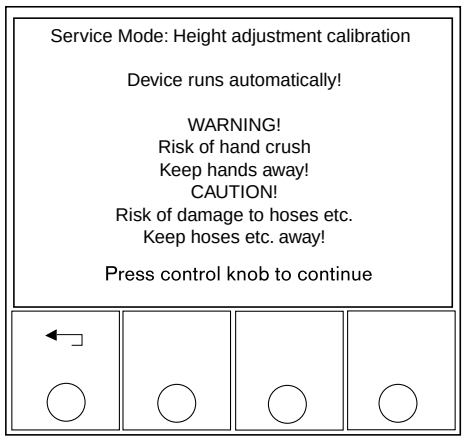



**Fig. 18:** DrägerService Mode, height adjustment 2

- Press the control knob.

Calibration is carried out automatically.

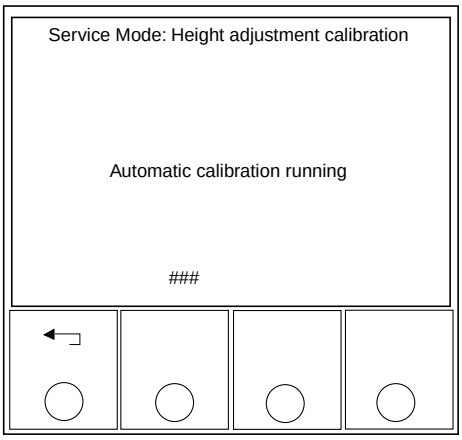



**Fig. 19:** DrägerService Mode, height adjustment 3

- Use the control knob to select the "Accept" field.
- Press the control knob to confirm.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 3.4 Tilt adjustment

DrägerService Mode "Tilt adjustment calibration" is used to calibrate the tilt adjustment motor.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Calibrations".
- Press the control knob.
- Use the control knob to select the menu item "Tilt adjustment".
- Press the control knob.

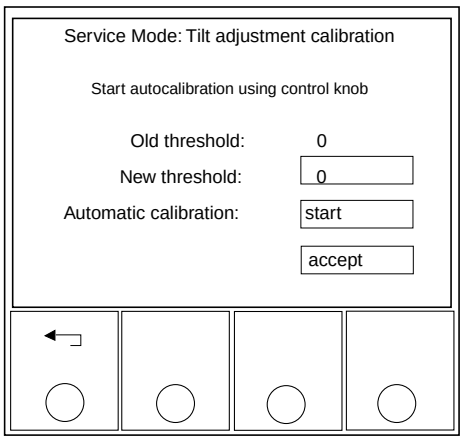



**Fig. 20:** DrägerService Mode, tilt adjustment motor

### 3.4.1 Adjusting the manual threshold

- Turn the control knob to place the cursor on the "new threshold" field and then press the control knob.
- Use the control knob to manually adjust a new threshold and then press the control knob.
- Use the control knob to select the "Accept" field.
- Press the control knob to confirm.

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### 3.4.2 Adjusting the automatic threshold

- Turn the control knob to place the cursor on the "start" field.
- Press the control knob.

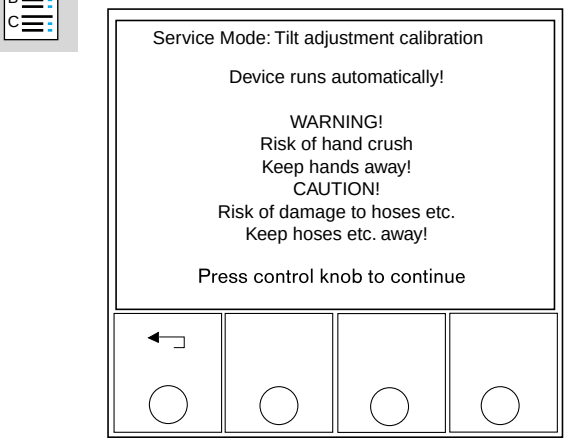



**Fig. 21:** DrägerService Mode, tilt adjustment motor 2

- Press the control knob.

Calibration is carried out automatically.

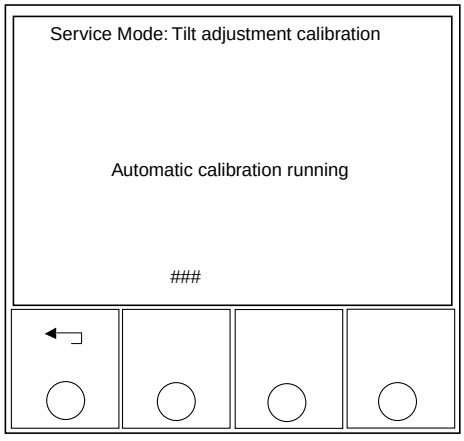



**Fig. 22:** DrägerService Mode, tilt adjustment motor 3

- Use the control knob to select the "Accept" field.
- Press the control knob.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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# 4 Logs

DrägerService Mode "Logs" has the following submenus:

- Error log
- Error history
- Operation history
- Back

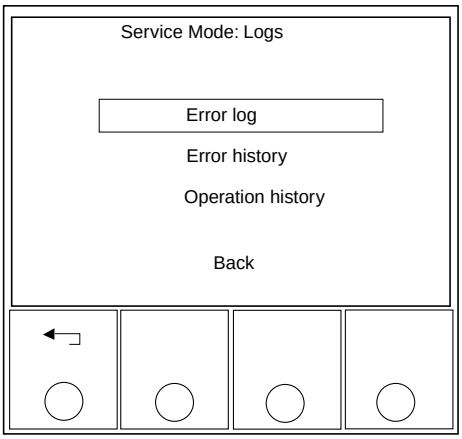



**Fig. 23:** DrägerService Mode, log

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## 4.1 Error log

DrägerService Mode "Error log" shows recorded error events on the EL display. Error messages are displayed as plain text. Each error has been assigned an error number and the number of occurrences. Entries in the error log can be deleted by using the „Delete“ button.

The error number displayed in the error log corresponds to the error description number in the error list.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Logs".
- Press the control knob.
- Use the control knob to select the menu item "Error log".
- Press the control knob.

If an error has occurred, the EL display will show the number of occurrences of this error.

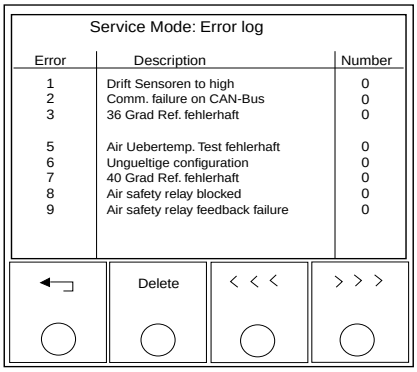



**Fig. 24:** DrägerService Mode, error log

- The second display key viewed from the left can be used to delete all error events.
- The two display keys on the right can be used to page up/down through the error list.

There will be no symbols on the display keys if there are no error entries up/down the list.

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 4.2 Error history

DrägerService Mode "Error history" shows the most recent error events on the EL display. The most recent error events (maximum of 30 errors) are stored in a chronological order. The most recent error event has number 1. The EL displays shows the date and time of occurrence and a short description. Error history entries can be deleted from the list using the "Delete" display key.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Logs".
- Press the control knob.
- Use the control knob to select the menu item "Error history".
- Press the control knob.

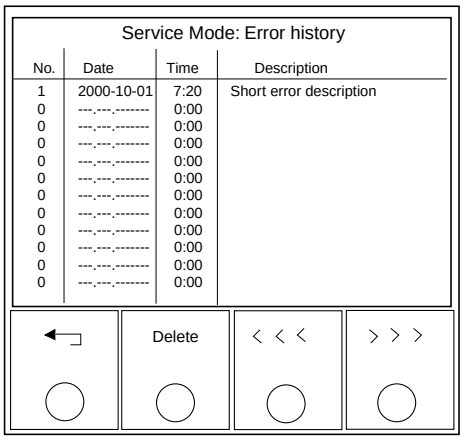



**Fig. 25:** DrägerService Mode, error history

- Delete any error entries from the list using the "Delete" display key.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 4.3 Operation history

DrägerService Mode "Operation history" shows the most recent operation parameters on the EL display: The "Operation history log" shows the most recent 30 operation steps in chronological order. The most recent operation step has number 1. The EL displays shows the date and the exact time of the operation. Operation history entries can be deleted from the list using the "Delete" display key.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Logs".
- Press the control knob.
- Use the control knob to select the menu item "Operation history".
- Press the control knob.

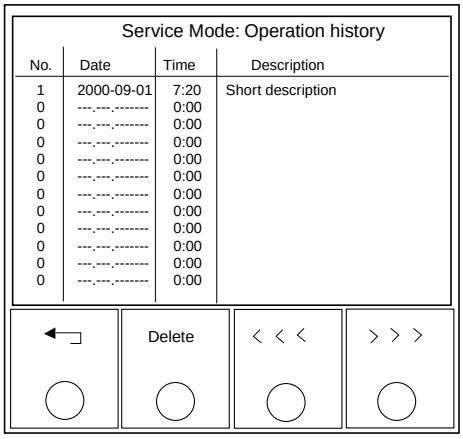



**Fig. 26:** DrägerService Mode, operation history

- Delete any operation steps from the list using the "Delete" display key.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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# 5 Diagnosis

DrägerService Mode "Diagnosis" is used to read out operating voltages, interfaces, as well as analog and digital signals.

DrägerService Mode "Diagnosis" has the following submenus:

- Operating voltages
- Keypad
- Sensor PCB
- Actuator PCB
- Output signals
- Digital signals
- Interface
- Back

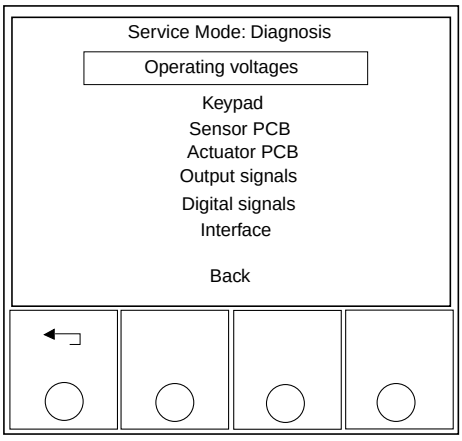



**Fig. 27:** DrägerService Mode, diagnosis

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## 5.1 Operating voltages

DrägerService Mode "Operating voltages" shows the measurable operating voltages and their status messages on the EL display.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Operating voltages".
- Press the control knob.

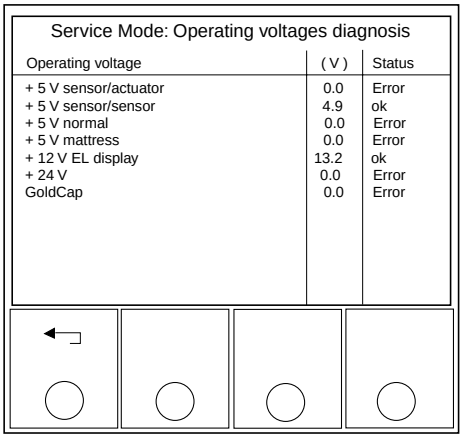



**Fig. 28:** DrägerService Mode, operating voltages

**Table 1: Status message display**

| | | |
|---|---|---|
| OK | = | Operating voltage is OK. |
| Error | = | Operating voltage is outside tolerance or not present. |

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 5.2 Keypad

DrägerService Mode "Keypad" is used to test the keys on the control unit.

### 5.2.1 Control keys test

This test is used to test the keypad.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Keypad".
- Press the control knob.

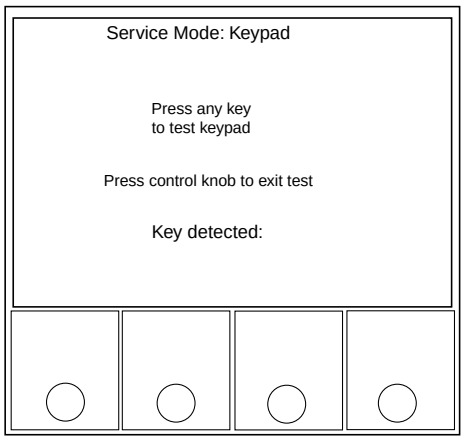



**Fig. 29:** DrägerService Mode, keypad test

- Press the keys one after the other.

The EL display shows the detected key in the center line.

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 5.3 Sensor PCB

DrägerService Mode "Sensor PCB" shows the physical readings including status messages (OK or error) of the Sensor PCB on the EL display.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Sensor PCB".
- Press the control knob.

The EL display shows the Sensor PCB data.

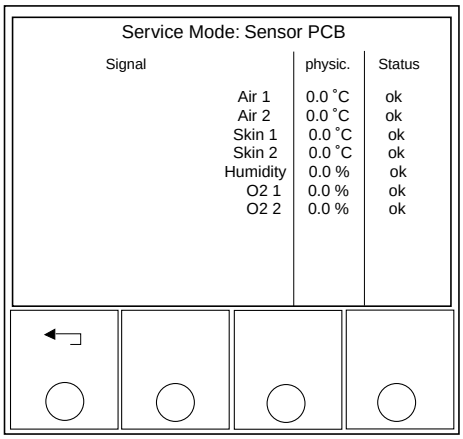



**Fig. 30:** DrägerService Mode, Sensor PCB

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 5.4 Actuator PCB

DrägerService Mode "Actuator PCB" shows the physical readings including status messages (OK or error) of the Actuator PCB on two pages on the EL display.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Actuator PCB".
- Press the control knob.

The EL display shows information about the Actuator PCB.

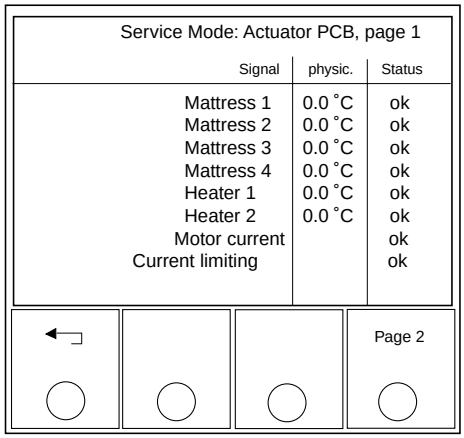



**Fig. 31:** DrägerService Mode, WT2 Actuator PCB (1)

- Press the "Page 2" key on the EL display.

The EL display shows additional information about the Actuator PCB.

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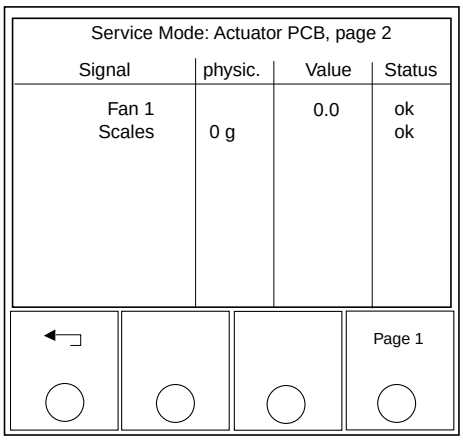



**Fig. 32:** DrägerService Mode, WT2 Actuator PCB (2)

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 5.5 Output signals

DrägerService Mode "Output signals" shows the control signals of the actuators including status messages (on or off) on the EL display.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Output signals".
- Press the control knob.

The EL display shows the components and control signals of the actuators. A feedback is given whether or not the output signal is present.

To switch „test“ from „off“ to „on“ turn the control knob **only** one step, otherwise the status will not be changed.

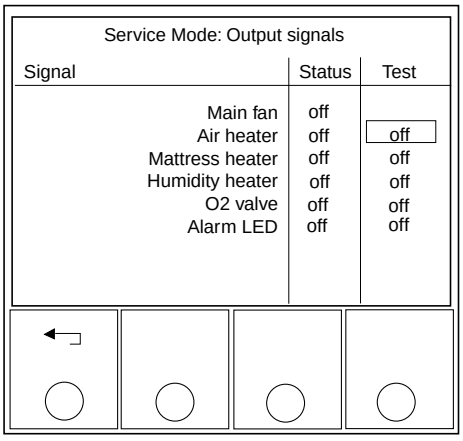



**Fig. 33:** DrägerService mode, output signals of actuators

- If applicable, enter the respective component using the control knob.
- Press the control knob.
- Use the control knob to select the respective function (on or off).

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- Press the control knob.
- Exit the DrägerService Mode as follows: Switch off the Caleo.




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## 5.6 Digital signals

DrägerService Mode "Digital signals" shows the digital signals including status messages (0 or 1) on the EL display.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Digital signals".
- Press the control knob.

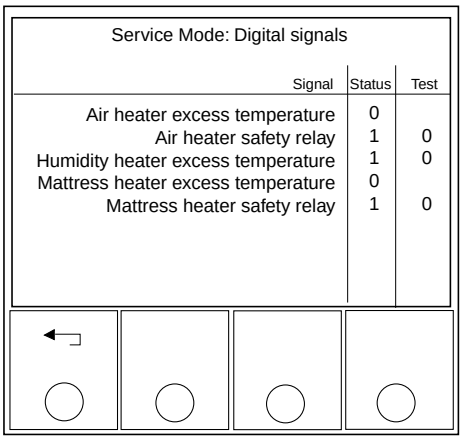



**Fig. 34:** DrägerService Mode, digital signals

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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## 5.7 Interface board

DrägerService Mode "Interface" is used to test the following interfaces:

- Nurse call
- Medibus
- Modem
- Back

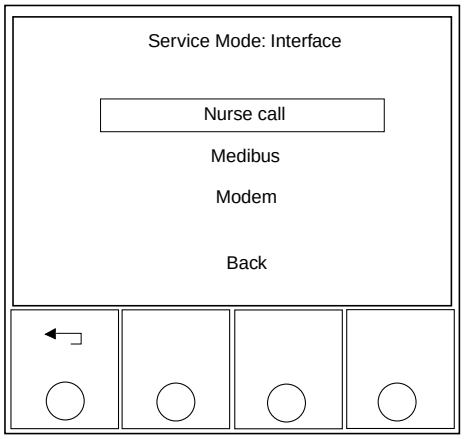



**Fig. 35:** DrägerService Mode, interface

### 5.7.1 Nurse call

The "Nurse call" test is used to test the relay for the external interface.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Interface board".
- Press the control knob.
- Use the control knob to select the menu item "Nurse call".
- Press the control knob.

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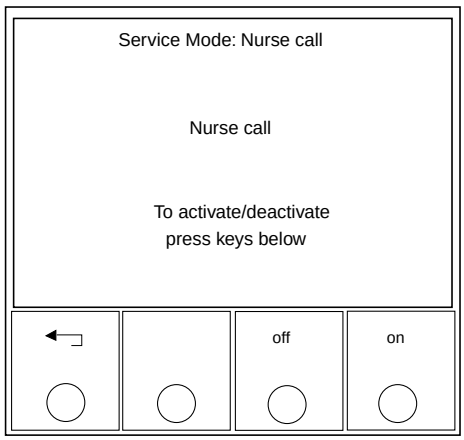



**Fig. 36:** DrägerService Mode, nurse call

- If applicable, switch on/off the nurse call using the display keys.
- Exit the DrägerService Mode as follows: Switch off the Caleo.

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### 5.7.2 Medibus

The Medibus test is used to test the RS232 interface; the test result (OK or error) is shown on the EL display.

- Connect a shorting plug to the Medibus interface.
- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Interface board".
- Press the control knob.
- Use the control knob to select the menu item "Medibus".
- Press the control knob.

The EL display shows the test result.

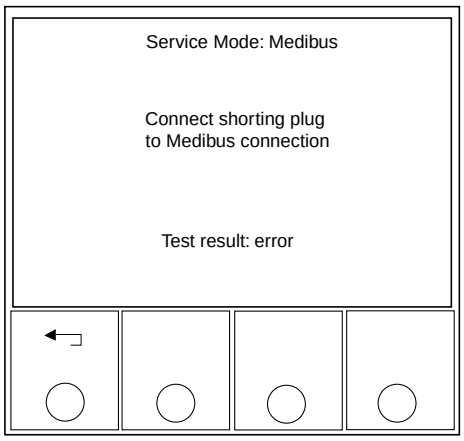



**Fig. 37:** DrägerService Mode, Medibus

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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### 5.7.3 Modem

The modem test is used to test the modem interface; the test result (ok or error) is shown on the EL display.

- Switch on the Caleo at the power switch.
- As soon as the device has finished its self-test, press the "menu" and "silence" keys simultaneously for 4 seconds.

The Caleo should now be in DrägerService Mode.

- Use the control knob to select the menu item "Diagnosis".
- Press the control knob.
- Use the control knob to select the menu item "Interface board".
- Press the control knob.
- Use the control knob to select the menu item "Modem".
- Press the control knob.
- Connect a shorting plug to the modem interface.

The EL display shows the test result.

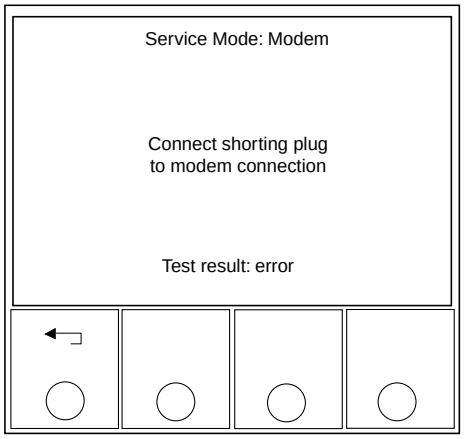



**Fig. 38:** DrägerService Mode, modem

- Exit the DrägerService Mode as follows: Switch off the Caleo.

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